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Atty Dkt No. 98-1449

**REMARKS:**

The Applicants have carefully reviewed the Examiner's comments in the Office Action and have prepared the following response.

Claims 2 and 14 have been cancelled.

Claims 1, 3, 11, 13, 15-17, and 21-22 have been amended.

Claims 1, 3-13, and 15-22 remain pending in the application.

By this paper, Applicants have cancelled dependent claim 2 and incorporated the limitation into independent claim 1. Likewise, Applicants have cancelled dependent claim 14 and incorporated the limitation into independent claim 11.

The Examiner rejected claims 11-22 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. More specifically, the Examiner indicated that it was unclear in claims 11, 13, 15, and 16 as to which conically shaped catalyst is implied. Responsive to the Examiner's rejections, claims 11, 13, 15, and 16 have been amended to clarify that all conically shaped catalysts disposed upstream of the main brick catalyst are implied. In addition, claims 14 and 21 have been amended to change the word 'catalyst' to 'catalysts'.

The Examiner rejected claims 1-3, 5-7 and 9 under 35 USC 102(b) as being anticipated by Maus (5,103,641). The Examiner also rejected claims 1-3, 5-7 and 9 under 35 USC 103(a) as being unpatentable over Shioya (5,144,800) in view of Maus. Applicants respectfully request reconsideration in view of the following comments.

Applicants' amended claim 1 requires the conically shaped catalysts be disposed contiguous to the exhaust ports of the engine and the conduits extending from the shell of the main brick catalyst house the conically shaped catalysts and attach directly to the engine. Furthermore, the conduits circumscribe the exhaust ports when attached to the engine. Support for amended claim 1 can be found in the specification, for example, on page 4 with the paragraph starting at line 5 and on also on page 6 from line 1 to line 20.

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Contrariwise, the references cited by the Examiner fail to teach the above-mentioned limitation. More specifically, Shioya, cited by the Examiner for teaching this limitation, actually teaches an exhaust manifold system that is adjacent to the exhaust ports and attaches directly to the engine. Downstream of the exhaust manifold and not contiguous to the exhaust ports is a catalyst 12 housed in the exhaust pipes 8 and 9 that attach to the exhaust manifold as shown in Figure 1. Thus, the housing for the conically shaped catalyst is not contiguous to the engine and does not circumscribe the exhaust port as required by Applicants' invention as claimed.

Therefore, even if combined, the above references fail to teach all of the limitations of Applicants' claim. Finally, with respect to claims 3, 5-7 and 9, Applicants point out that these claims add additional features to amended independent claim 1 and are therefore allowable for the reasons set forth above.

The Examiner rejected claims 4 and 8 under 35 USC 103(a) as being unpatentable over Maus in view of Gottberg (5,996,339). The Examiner also rejected claims 4 and 8 under 35 USC 103(a) as being unpatentable over Shioya in view of Maus and further in view of Gottberg. Without conceding the Examiner's position, Applicants note that claims 4 and 8 depend either directly or indirectly from amended independent claim 1 and are therefore also allowable for the reasons set forth above.

The Examiner rejected claims 11-17 and 19 under 35 USC 103(a) as being unpatentable over Shioya in view of Maus, Gary (5,103,641) and GB 1,455,351 and further in view of Gottberg. Applicants respectfully request reconsideration in view of the following comments.

Applicants' amended independent claim 11 requires that the plurality of catalysts be disposed contiguous to the exhaust ports and that the conduits extending from the shell of the main brick catalyst be attached directly to the engine and circumscribe the exhaust ports when attached. Support for amended claim 11 can also be found in the specification, for example, on page 4 with the paragraph starting at line 5 and on page 6 from line 1 to line 20.

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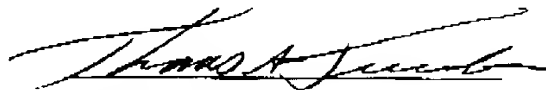
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As with claims 1-3, 5-7 and 9 discussed above, the references cited by the Examiner fail to teach the limitations required by claim 11. More specifically, Shioya, as cited by the Examiner for teaching this limitation, actually teaches an exhaust manifold adjacent the exhaust ports and attached directly to the engine. In Shioya, a catalyst is disposed downstream of the exhaust manifold and not contiguous to the exhaust ports as required by Applicants' invention as claimed. Furthermore, the catalyst housing does not circumscribe the exhaust ports when attached to the engine. Therefore, even if the references cited by the Examiner can be combined, they still fail to teach all of the limitations of Applicants' claim.

Applicants understand claims 21-22 to be allowable after amending independent claim 21 responsive to the Examiner's 112, second paragraph rejection. Claims 21 and 22 were not rejected for any other reason and are therefore believed to be allowable as amended to overcome the 112, second paragraph rejection.

In view of the foregoing amendments and remarks, Applicants submit that the claims are patentable over the prior art and the application is in a condition for allowance. Applicants respectfully request reconsideration and an early notice of allowance. If a telephone conference would expedite allowance or resolve any further questions, such a conference with the undersigned is invited at the convenience of the Examiner.

Respectfully submitted,



Thomas A. Jurecko  
Reg. No. 48,392

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DAIMLERCHRYSLER INTELLECTUAL CAPITAL CORPORATION  
DAIMLERCHRYSLER TECHNOLOGY CENTER  
CIMS 483-02-19  
800 CHRYSLER DRIVE  
AUBURN HILLS, MI 48326-2757  
248.944.6525

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## **ATTACHMENT**

### **SPECIFICATION AMENDMENTS:**

Figure 1 is a side view of the catalyst system of the present invention, [ina] in a six cylinder V-configuration engine;

The shell 106 includes an exit portion 112 disposed at the downstream end 114 thereof. The exit portion 112 leads to an exhaust pipe 116 that runs longitudinally with the vehicle and preferably exits near the back end thereof. Figure 2 illustrates the catalyst system 100 with the engine 102 removed from illustration. Figure 2 also includes a portion of the shell 106 cut away so that a section of the internals thereof can be illustrated. The tubes 108 of the preferred embodiment shown in Figure 2 can be more particularly identified as forward-most 200, medial 202, and rearward-most 204. Each tube 200, 202, and 204 includes a conically shaped catalyst inserted therein. The forward-most tube 200 includes a forward-most conical catalyst 210, the medial tube 202 includes a medial conical catalyst 212, and the rearward-most tube 204 includes a rearward-most conical catalyst 214. The specific shape and orientation of the [catalyst 210,212,] catalysts 210, 212, and 214 shall be discussed subsequently in detail. Shell 106 houses a main catalyst brick 220 which extends substantially to the exhaust pipe 116.

Figure 4 illustrates a second embodiment of the present invention. The general construction is somewhat similar to that described in detail in the first embodiment, therefore, only the differences will be described in detail. The main catalyst brick 220 in the second embodiment includes a plurality of angled surfaces 400, 402, and 404 at its upstream end. The number of angled surfaces corresponds to the number of exhaust ports 104 of the engine 102 in that particular region or side of the engine 102. Each angled surface 400, 402, and 404 is substantially parallel with the rear surface 310 of the conical catalysts 210, 212,

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and 214. The main catalyst brick 220 include surfaces that are parallel with the flow of exhaust gases 320 that interconnect the angled surfaces. Surface 406 interconnects angled surface 400 and 402 and surface 408 interconnects angled surface 402 and 404. Surfaces 406 and 408 include a flow restrictor 410 extending therefrom and abutting the shell 106 between the tubes 108. Flow restrictors 410 limit mixing within open chamber 312 and direct the exhaust gas flow from the conical [catalysts210] catalysts 210, 212, and 214 to the main catalyst brick 220.

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**CLAIM AMENDMENTS:**

1. (AMENDED) A catalyst system for a motor vehicle having an engine with an exhaust port that carries exhaust gases away from the combustion chamber of the engine, wherein the exhaust gases leave the combustion chamber and flow in a downstream direction by first entering the exhaust port, said catalyst system comprising:  
    a shell with at least one conduit extending therefrom;  
    a conically shaped catalyst disposed contiguous to the exhaust port of the engine; and  
    a main brick catalyst having an angled front face disposed downstream of said conically shaped catalyst, wherein the shell encloses the main brick catalyst and the at least one conduit houses the conically shaped catalyst and the at least one conduit is attached to the engine and circumscribes the exhaust port when attached.
3. (AMENDED) The catalyst system as set forth in claim [2] 1, wherein said conically shaped catalyst includes a rear face disposed at an angle from said angled front face of said main brick catalyst.
11. (AMENDED) A catalyst system for a motor vehicle having an engine with a plurality of exhaust ports that carry exhaust gases away from the combustion chamber of the engine, wherein the exhaust gases leave the combustion chamber and flow in a downstream direction by first entering the exhaust ports, said catalyst system comprising:  
    a shell with a plurality of conduits extending therefrom,  
    a plurality of conically shaped catalysts disposed [adjacent] contiguous to the exhaust ports of the engine; and  
    a main brick catalyst having a front face that includes a plurality of angled surfaces disposed downstream of said conically shaped [catalyst] catalysts, wherein the shell encloses the main brick catalyst and the plurality of conduits house the plurality of conically shaped catalysts and the plurality of conduits are attached to the engine and circumscribe the exhaust ports when attached.

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13. (AMENDED) The catalyst system as set forth in claim 12, wherein each of said conically shaped [catalyst includes] catalysts include a rear face that is substantially parallel to one of said plurality of angled [surface] surfaces of said main brick catalyst.
15. (AMENDED) The catalyst system as set forth in claim 11, wherein each of said conically shaped [catalyst includes] catalysts include cells having a cross sectional area, said cross sectional area of at least one of said cells of said conically shaped [catalyst] catalysts increases in the downstream direction.
16. (AMENDED) The catalyst system as set forth in claim 15, wherein each of said conically shaped [catalyst includes] catalysts include a metallic substrate.
17. (AMENDED) The catalyst system as set forth in claim 16, wherein said main [catalyst brick] brick catalyst includes a plurality of cells of a constant cross sectional area.

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21. (AMENDED) A catalyst system for a motor vehicle having an engine with a plurality of exhaust ports that carry exhaust gases from the combustion chamber of the engine, wherein the exhaust gases leave the combustion chamber and flow in a downstream direction by first entering the exhaust ports, said catalyst system comprising:

a plurality of conically shaped [catalyst] catalysts disposed [adjacent] contiguous to the plurality of exhaust ports of the engine, said conically shaped catalysts have a front face and a rear face, said rear face being larger than said front face, each of said conically shaped catalysts also include a metal substrate and a plurality of cells that vary in size, said cell size increasing in the downstream direction [, said plurality of conically shaped catalysts include a metal substrate];

a shell that includes a plurality of tubes extending therefrom, said plurality of tubes receive said plurality of conically shaped catalysts, said shell includes an exit portion that decreases in diameter in the downstream direction and said tubes are attached to the engine and the shell is disposed downstream from the engine;

a main brick catalyst disposed within said shell, said main brick catalyst is substantially cylindrical in shape and disposed downstream from said plurality of conically shaped catalysts, said main brick includes an angled front face and a downstream end, said downstream end has a conically shaped formation that decreases in diameter in the downstream direction at a rate greater than the rate at which said exit portion of said shell decreases in the downstream direction, said main catalyst brick includes a ceramic substrate; and

an exhaust pipe attached to said exit portion of said shell.

22. (AMENDED) The catalyst system as set forth in claim [22] 21, wherein said main brick catalyst includes a plurality of angled surfaces interconnected by at least one surface parallel to the exhaust gas flow through said main catalyst brick.